REMARKS

Claims 14-31 are pending. Claims 14, 21-23, and 30-31 have been amended. Claims 1-13 have been previously canceled without prejudice. Applicants expressly reserve their right to prosecute any canceled our unclaimed subject matter in one or more continuation, continuation-in-part or divisional applications. The amendments are fully supported by the specification and do not constitute new matter. Specifically, support can be found at p. 1, lines 16-20; p. 4, lines 11-14; p. 5, lines 4-14; p. 5, line 29 to p. 6, line 22; p. 7, lines 5-20; and the original claims and drawings. Applicants respectfully request that the amendments and remarks made herein be fully considered and entered into the file of the above-identified application.

I. Response to Examiner's Comments A-F

According to the Examiner, Applicants' arguments filed on April 22, 2003 are not deemed persuasive for reasons A-F as set forth in the Office Action. Applicants summarize and respond to each of these comments below:

A. According to the Examiner, the Applicants argument that the present invention provides a mechanism that can stably maintain the uniformity of the magnetic field is not persuasive because "arguments drawn to features not claimed are not persuasive." The Applicants respectfully note that the claims recite all the features which provide a mechanism that can stably maintain the uniformity of the magnetic field and invite the Examiner's attention to Applicants' specification at page 3, line 30 to page 7, lines 20. Thus, the specification fully supports the Applicants statement that the claimed features provide a mechanism that can stably maintain the uniformity of the magnetic field.

The Applicants are not required to amend the claims to add explanations of limitations as limitations themselves where such explanations are fully supported by the specification. The claims specifically recite "a magnetic field correcting unit that generates an additional magnetic field that corrects non-uniformity of distribution of said static magnetic field within said inspection space." By correcting non-uniformity of distribution of the static magnetic field within the inspection space, the uniformity of the magnetic field is stably maintained within the inspection space (*see* specification at page 3, line 30 to page 7, lines 20).

B. In addition, according to the Examiner, the terms "uniformity" and "non-uniformity" have a broader scope than Applicants' argued definition. In reply, the Applicants have amended the claims to recite "non-uniformity of distribution of said static magnetic field within said inspection space . . . " and refer the Examiner to the arguments set forth below.

C. The Examiner also states that the feature that the shim coil consists of one or more coils that generates a magnetic field of the z^2 and z^4 terms is not set forth in the independent claims. Additionally, the Examiner asserts that each temperature component for each shim coil is not set forth in the independent claims. In reply, the Applicants respectfully note that these issues are now moot in view of the claim amendments and arguments presented below.

D. The Examiner also states that an iron yoke is not a static magnetic field generating means. The Applicants hereby clarify their previous argument by inviting the Examiner's attention to the specification at page 8, last line to page 9, line 3 which states that the static field generating magnet comprises a pair of superconducting coils facing each other in Fig. 1 and an iron yoke that forms a magnetic circuit to surround the superconducting coils. Thus, the Applicants agree with the Examiner that an iron yoke by itself is not a static magnetic field generating means.

E. The Examiner additionally states that "correcting the sum of the non-uniformity of the magnetic field" is not claimed. In reply, the Applicants respectfully note that this issue is now moot in view of the amendments and the arguments presented below.

F. Furthermore, the Examiner states that our previous argument relating to uniformity vs. intensity is not persuasive because conventionally the uniform intensity is used to describe the magnetic field of an NMR / MRI device, and by correcting the magnetic fields of the device to make the fields more uniform with higher intensity, the prior art allegedly corrects the non-uniformities present. Therefore, according to the Examiner, the intensity correction methods of the prior art allegedly suggest magnetic field non-uniformity correction.

In reply, the Applicants hereby clarify their argument with respect to the difference between intensity and non-uniformity. The "non-uniformity" described in the specification means the "non-uniformity of the magnetic field intensity within the inspection space" (*see* p. 1, lines 16-21; p. 11, lines 26-27; & p. 19, lines 3-24). The intensity of the magnetic field is

used in macroscopic terms. For example, the specification value such as 1.0T or 0.3T of an MRI apparatus is the intensity in macroscopic terms. When a space having the magnetic field intensity in macroscopic terms has a microscopic spatial change in the intensity, this spatial change of the intensity is called the non-uniformity. Thus, "non-uniformity" refers to the non-uniformity of distribution of the static magnetic field intensity within the inspection space. The invention is aimed at minimizing this non-uniformity.

II. The Claim Rejections under 35 U.S.C. §103 Should be Withdrawn

The Examiner has maintained the rejection of claims 14-31 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Yamaguchi et al.* (U.S. Patent No. 4,663,592; hereafter "*Yamaguchi*") in view of *Warner* (GB 2 219 406; hereafter "*Warner*"). Applicants respectfully disagree with the rejection.

A. Neither Yamaguchi Or Warner Disclose Non-Uniformity Of The Static Magnetic Field Or A Way To Correct It By Generating An Additional Magnetic Field

The Examiner states that *Yamaguchi* teaches, suggests, and shows a magnetic field correcting unit "that generates an additional magnetic field for making uniform a space distribution of the static magnetic field" (Examiner's Office Action at page 5 lines 16-17; *citing* Yamaguci at col. 2, lines 33-41, col. 2, line 42 through col. 3, line 39; and Figures 1 & 5). The Applicants attorneys have read and reread the cited portion of *Yamaguchi* relied on by the Examiner in support of the above statement and respectfully remain perplexed since they find absolutely no such teaching, suggestion, or showing either expressly or implicitly that a magnetic field correcting unit "generates an additional magnetic field for making uniform a space distribution of the static magnetic field." Nor do they find any suggestion "that at least one additional magnetic field is applied to keep the static magnetic field Ho constant" "by controlling the current" as asserted by the Examiner in the Office Action at page 5 line 18 to page 6, line 1.

The Examiner further asserts that the ability to generate an additional controlling magnetic field is taught by *Warner*, and thus uses *Warner* to cure the deficiencies in *Yamaguchi* relating to the additional controlling magnetic field. However, the Applicants respectfully traverse this argument because, like *Yamaguchi*, *Warner* does not teach or suggest non-uniformity or a way to correct the non-uniformity of the static magnetic field.

As described in Applicants previous response, *Yamaguchi* discloses a correction of ***the intensity of the static magnetic field*** corresponding to the temperature change of the MRI apparatus. In other words, *Yamaguchi* teaches an apparatus with a control means that minimizes the ***fluctuations in the magnetic field intensity H_0 (i.e., increase or decrease in intensity of the static magnetic field)***, due to temperature changes on the NMR image. However , the reference does not teach that the variations in temperature cause non-uniformity of the static magnetic field. Moreover, it does ***not*** teach or even suggest a means to ***correct the non-uniformity*** of the static magnetic field, rather than intensity of it. For example, as in the first embodiment (Figure 1) of *Yamaguchi*, it is clear that the intensity of the magnetic field is reduced due to the heat expansion of coils 1 and the enlargement of an interval between magnet coils (column 2, lines 52-61). The correction here is carried out by detecting a temperature change using temperature detecting devices 11-16 placed on the magnet coils 1, frames 3 and around the magnet, and controlling current I supplies the additional current to the magnetic coils so as to simply compensate the decrease of intensity in accordance with changes in temperatures of the magnetic coils and/or the frames based on data of the temperature detecting devices (column, lines 30-39). Such controls of the current result in ***mere increase or decrease of the magnetic field*** but ***not*** in correction of non-uniformity of the magnetic field.

Warner discloses electromagnets provided with temperature sensors on ferromagnetic annuli 3, 4. The magnetic field produced by at least one control winding may be arranged to cancel accurately the magnetic field change caused by temperature variations in at least one ferromagnetic means (page 6, lines 2-6). According to *Warner*, the current applied to the control winding is arranged to vary according to the value of the sensing by the temperature sensor and the magnetic field change is thereby maintained within 0.1 ppm even if the environment temperature changes by 10°C (page 5, line 33 through page 6, line 10). However, as in *Yamaguchi*, correcting means of *Warner* simply compensates the ***electromagnet's total magnetic field, i.e., the magnetic field intensity*** (*see*, for example, Abstract; page 4, lines 27 and 34-36; page 5, lines 3-5 and 26-32; page 6, lines 7-10, etc.). Thus, this reference does not teach or even suggest non-uniformity of the static magnetic field caused by the temperature change, or a way to correct such non-uniformity.

As stated above, "non-uniformity" means the "non-uniformity of the magnetic field intensity within the inspection space" (*see* p. 1, lines 16-21; p. 11, lines 26-27; & p. 19, lines

3-24). The intensity of the magnetic field is used in macroscopic terms. For example, the specification value such as 1.0T or 0.3T of an MRI apparatus is the intensity in macroscopic terms. When a space having the magnetic field intensity in macroscopic terms has a microscopic spatial change in the intensity, this spatial change of the intensity is called the non-uniformity. Thus, "non-uniformity" refers to the non-uniformity of distribution of the static magnetic field intensity within the inspection space. The present invention is aimed at minimizing this non-uniformity.

Neither *Yamaguchi* or *Warner* teaches or even suggests non-uniformity of the static magnetic field caused by the temperature change or a way to correct such non-uniformity by generating an additional magnetic field for correcting non-uniformity of distribution of the static magnetic field within the inspection space. Thus, the present claims are not obvious over *Yamaguchi* in view of *Warner*.

B. Combining Yamaguchi with Warner Would Change The Principle Operation Of Yamaguchi And Render The Device In Yamaguchi Inoperable For Its Intended Purpose

According to MPEP § 2143.01, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification. Likewise, if the proposed modification or combination of prior art would change the principle operation of the prior art invention being modified, the teachings of the references are not sufficient to render the claims *prima facie* obvious. The Examiner employs *Warner* to modify the device in *Yamaguchi* which lacks an additional controlling magnetic field. However, the additional controlling magnetic field in *Warner* is produced by a winding possessing unique dimensional properties and uniquely located in the *Warner* apparatus (see Figs. 1-3). To modify the apparatus disclosed in *Yamaguchi* with the winding of *Warner* would render the apparatus in *Yamaguchi* unsatisfactory for its intended purpose or otherwise change the principle operation of the device in *Yamaguchi* since the *Yamaguchi* NMR apparatus does not appear to be dimensioned to accept the winding of *Warner* and function properly.

Applicants believe that all pending claims 14-31 are now in condition for allowance, early notification of which is earnestly requested. No fee, other than the Request for Continued Examination, is believed to be due for this amendment. Should any fee be required, please charge such fee to Deposit Account No. 16-1150.

Respectfully submitted,

James G. Markey Reg. No.: 31,636
by Brian C. Remy Reg. No.: 48,176

Date: September 29, 2003

James G. Markey (Reg. No. 31,636)

PENNIE & EDMONDS LLP
1155 Avenue of the Americas
New York, New York 10036-2711
Tel.: (212) 790-9090